Iowa Statewide Rural Well Water Survey Phase 2 (SWRL2)

SWRL2 was conducted from May 2006 through December 2008. A total of 473 private drinking water wells were sampled in 89 Iowa counties; 87% of the well owners responded to a well construction and site survey. SWRL2 objectives were to 1) estimate the status of drinking water quality in a sample of Iowa private rural wells, 2) look for trends in water quality since 1988–89 (original SWRL study), and 3) collect data on emerging contaminants in private well water. Water samples were analyzed at the University Hygienic Laboratory.

Statewide results on contaminants of public health interest (% of total 473 wells):

- Bacteria: 43% had total coliform bacteria, 19% had enterococci, 11% had *E. coli*
- Nitrate: 49% had nitrate; 12% had ≥10 mg/L (parts per million) nitrate-N, EPA's drinking water standard for public water supplies
- Arsenic: 48% had arsenic; 8% had arsenic ≥0.01 mg/L, EPA's drinking water standard for public water supplies
- Pesticides (parent compounds): 8% had atrazine at very low concentrations; 2% had metolachlor; acetochlor, alachlor and trifluralin were detected in <1% of wells
- Herbicide degradates (breakdown products of the parent compound): 11% had desethyl-atrazine, 11% had acetochlor ESA (ethane sulfonic acid), 27% had alachlor ESA, 33% had metolachlor ESA, and 8% had metolachlor OXA (oxanilic acid)

Statewide results on associations between contaminants and well survey variables:

- Shallower wells (<100 feet deep) had more total coliform bacteria detections and herbicide degradate detections than deeper wells
- Shallower wells (<100 feet deep) had higher nitrate concentrations than deeper wells
- Older wells (constructed before 1991) had more total coliform bacteria detections and herbicide degradate detections than newer wells
- Total coliform bacteria, enterococci and *E.coli* detections were more common in the northwest, southwest and south-central regions of the state
- Higher nitrate concentrations (≥10 mg/L nitrate-N) were more common in the northwest and southwest regions of the state

Water quality trends (from 116 wells which were sampled in 1988–89 and in 2006):

- Total coliform bacteria detections were comparable (1988-89: 41%, 2006: 44%)
- Nitrate detections were more common in 1988–89 (58%) than in 2006 (47%)
- High nitrate concentrations (≥10 mg/L nitrate-N) were more common in 1988–89 (18%) than in 2006 (12%)

Recommendations:

- Utilize Grants to Counties Program funds to test well water samples for arsenic and herbicide degradates (in addition to testing for bacteria and nitrate)
- Develop a public information program (possible health effects, water treatment options, etc.) on arsenic, herbicide degradates and other drinking water contaminants for use by County Public/Environmental Health Departments